SEMESTER EXAMINATION DECEMBER-2024

Course Name: - B.Tech(ECE) **Semester:- III**

Paper Name: - Network Theory **Paper Code:- TEC304**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न **तीन अंक** का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न **10 अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) In a standard network, the source is connected to:

a) Input port only b) Output port only c) Both ports d) Neither port

ii) The impedance and admittance of a circuit are:

a) Equal quantities b) Reciprocal of each other c) Independent quantities d) Directly proportional

iii) A circuit that contains two unequal resistances in parallel will have:

a) Higher equivalent resistance b) Lower equivalent resistance c) Equal resistance d) Zero resistance

iv) . In a two-port network, what do Y-parameters represent?

a) Impedance parameters b) Admittance parameters

c) Hybrid parameters d) Transmission parameters

v) In a simple graph with n vertices, what is the maximum number of edges possible?

a) n(n+1)/2 b) (n(n-1))/2 c) n2 d) 2n

Section – B (खण्ड–ब)

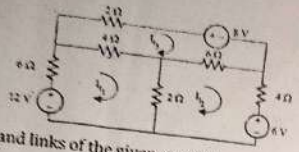
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. **5x7=35**

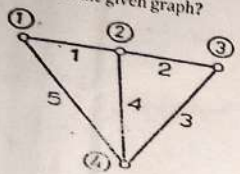
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i) Write the statements of Superposition, Tellegen's and Maximum power Transfer Theorems used in Network analysis.

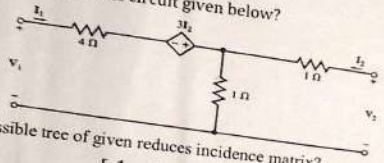
ii) A network has been shown below. Write down tie set matrix



iii) Show the tree, twigs and links of the given graph?



iv) Find the Z-parameters of the circuit given below?



v) Obtain the no. of possible tree of given reduces incidence matrix?

$$A = \begin{bmatrix} 1 & 1 & 0 & 0 & 0 & 1 \\ 0 & -1 & 1 & -1 & 0 & 0 \\ -1 & 0 & -1 & 0 & -1 & 0 \end{bmatrix}$$

vi) Explain why inductors oppose sudden changes in current while capacitors oppose sudden changes in voltage.

vii) How does Norton's theorem complement Thevenin's theorem? Explain with an example.

Part C

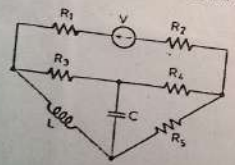
Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

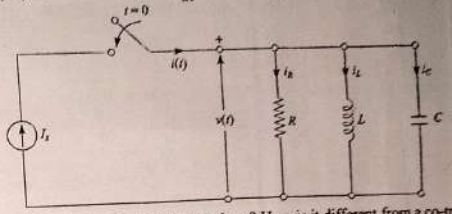
3. Answer any two of the following question in maximum 300 words. 2x10=20

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Write applications of Maximum power transfer theorem. Draw the dual of network shown in figure below



ii) Consider the RLC circuit shown in fig. Is=10A; R=2Ω; L=1H; C=0.5μF and iL(0+)=0A.Determine v(0+); $\frac{dv}{dt}(0+)$ and $\frac{d^2v}{dt^2}(0+)$



iii) (a) What is a tree in network topology? How is it different from a co-tree?
(b) Define Z-parameters and explain how they are measured in two-port networks.

MID-TERM EXAMINATION DECEMBER-2024

Course Name: - B.Tech(ECE) Semester:- III
Paper Name: - Network Theory Paper Code:-TEC304
Time - 30 minutes Max Marks-20
निर्देश: प्रत्येक प्रश्न 02 अंक का है। सभी प्रश्न अनिवार्य हैं।

Q1. Z-parameters are measured with:
a) Output short-circuited
b) Output open-circuited
c) Input short-circuited
d) Input open-circuited

Q2. Y-parameters are measured with:
a) Output short-circuited
b) Output open-circuited
c) Both ports open-circuited
d) Both ports short-circuited

Q3. The response of a circuit consists of:
a) Only transient response
b) Only steady state response
c) Sum of transient and steady state responses
d) Product of responses

Q4. In a parallel RLC circuit at resonance:
a) Impedance is maximum
b) Impedance is minimum
c) Current leads voltage
d) Current lags voltage

Q5. The quality factor Q of a circuit is:
a) Energy stored/Energy dissipated
b) Energy dissipated/Energy stored
c) Power factor
d) None of these

Q6. During transients in an inductor:
a) Current cannot change instantaneously
b) Voltage cannot change instantaneously
c) Both can change instantaneously
d) Neither can change

Q7.A capacitor in steady state DC behaves as:

a) Short circuit
b) Open circuit
c) Resistance
d) Inductance

Q8. In an RC circuit with R = 100Ω and C = 10μF, what is the time constant?

a) 1 ms
b) 0.1 ms
c) 1 μs
d) 10 ms

Q9. A capacitive reactance is 5Ω at 50Hz. What will be its value at 30Hz?

a) 3Ω
b) 8.33Ω
c) 7.5Ω
d) 10Ω

Q10. If voltage V = 326 sin 418t and current I = 2 sin(418t - π/3), what is the circuit impedance?

a) 153∠60°
b) 163∠60°
c) 163∠30°
d) 153∠30°

SEMESTER EXAMINATION, DECEMBER - 2024

Course Name: - B.Tech. **Semester:- 3rd**

Paper Name: - Industrial Sociology **Paper Code:- THS 302**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय–3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks.**
- SectionC- Answer any **2 out of 3** given questions. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में सात प्रश्नों में से किन्हीं पाँचप्रश्नों के उत्तर दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दोप्रश्नों के उत्तर दें। प्रत्येक प्रश्न **10** अंक का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठप्रश्न)

1. Answer allthe following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) The father of Sociology is

a) Cicero
b) Kautilya
c) Ab-dal-rehman Ibn-Kaldan
d) None of these

ii) The father of Industrial sociology is

a) Elton Mayo
b) Karl Marx
c) Braver man
d) Durkheim

iii) What is the meaning Industrial revolution?

a) Change of monarchy
b) Change in production system
c) Change in social system
d) None of these

iv) Industrial revolution started in which country?

a) America
b) France
c) England
d) Russia

v) The impact of industry on religion according to Elton mayo is transferred from

a) A religious to non regious society
b) A ritualistic to secular society
c) An established to an adaptive society
d) None of these

Section – B (खण्ड–ब)

Short Answer Questions (लघूउत्तरीय प्रश्न)

2. Answer any five of the following questions. 5x7=35

i. Explain the various stages of development of industrial sociology.

ii. Explain in brief the application of industrial sociology.

iii. Discuss the role of industrialization.

iv. Discuss the collective bargaining with its feature.

v. Discuss the concept of industrial dispute.

vi. Discuss the various causes of industrial dispute.

vii. Discuss about the industrial settlement machinery.

Section - C (खण्ड–स)

Descriptive Questions (विवरणात्मकप्रश्न)

3. Answer any two of the following questions. 2x10=20

i) Discuss the nature and function of trade union

ii) Discuss the characteristic feature of Indian workers.

iii) Discuss about the corporate social responsibility.

Section - D (खण्ड–द) 2X10 = 20

Objective Questions (वस्तुनिष्ठप्रश्न)

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) What is the primary focus of industrial sociology?
   a. Studying the social dynamics within a family unit
   b. Examining the social structures and relationships within an industrial workplace
   c. Analyzing political systems in developed nations
   d. Investigating the impact of technology on rural communities

ii) Which concept refers to the division of labour within a factory, where tasks are broken down into smaller, specialized jobs?
   a. Bureaucracy
   b. Social stratification
   c. Alienation
   d. Work specialization

iii) . Which sociologist is often regarded as a pioneer in the study of industrial society?
   a. Karl Marx
   b. Max Weber
   c. Emile Durkheim
   d. Frederick Winslow Taylor

iv) The term "industrial relations" primarily refers to the relationship between:
   a) Employees and customers
   b) Employers and employees
   c) Workers and machinery
   d) Managers and shareholders

v) According to Karl Marx, what causes class conflict in industrial societies?
   a) Religious differences
   b) Unequal access to education
   c) The exploitation of labour by capital
   d) Lack of technological advancement

What is the concept of "alienation," as proposed by Marx, in the context of industrial work?

a) Feeling of empowerment in work
b) Emotional connection with labour
c) Disconnection from the product, process, and fellow workers
d) Increased motivation for higher productivity

vii) What is the full form of C S R ?

a) Co-operative Social Responsibility
b) Corporate Social Responsibility
c) Company Social Responsibility
d) All of the above

viii) The "human relations approach" in industrial sociology is most closely associated with:

a) Elton Mayo
b) Max Weber
c) Henri Fayol
d) Frederick Taylor

ix) The full form of INTUC is

a) International trade union congress
b) Indian national trade union congress
c) The united trade union congress
d) None of these

x) The book written by Abul Fazal is

a) Arthshastra
b) Aain-e-akabari
c) Both
d) None of these

SEMESTER EXAMINATION DECEMBER-2024

ourse Name: - B.Tech(EC) **Semester:-III**

aper Name: - Signals and Systems **Paper Code:- TEC 303**

ime - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। **अधिकतम अंक–70**

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks.**
- Section D- Each question carries **2 mark. All questions are compulsory.**

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

i) Continuous time unit step function u(0) equal to

a) -1/2

b) -1

c) 1/2

d) Infinite

ii) Determine the convolution of $x(t) \odot \delta(t)$

a) x(t)

b) δ(t)

c) 0

d) 1

iii) The Z-transform of x[n]= u(n) is

a) 0

b) 1

c) z

d) z/(z-1)

iv) Find the sampling frequency of $x(t) = \sin(200\pi)$

a) 0 Hz

b) 50 Hz

c) 200 Hz

d) 100 Hz

v) Laplace transform of x(t)= tu(t) function equal to

a) 1

b) $\frac{1}{s}$

c) $\frac{1}{s^2}$

d) None of these

Section - B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions. 5x7=35
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर दें।

i. Determine energy and power of following signals.
(a) $x(t) = e^{-2t}u(t)$ (b) $x(t) = e^{j(2t+\pi/4)}$ (c) $x(t) = u(t)$

ii. For each signal determine whether it is periodic or aperiodic signal and calculate its fundamental time period
(a) $x(t) = \text{Cos}(\pi/3)t + \text{Sin}(\pi/4)t$ (b) $x[n] = e^{7\pi n}$ (c) $x[n] = \text{Cos}[3\pi n+\pi/4]$

iii. Determine and sketch the convolution of two signal
$x(t) = 1$ $-1 \le t \le 1$ $h(t) = \delta(t+1) + 2\delta(t+2)$

iv. Determine the Laplace Transform and ROC
(a) $x(t) = e^{-2t}u(t) - e^{-3t}u(t)$ (b) $x(t) = u(3t)$ (c) $x(t) = \text{Cos}(\omega t)u(t)$

v. Find the inverse Laplace transform

$$X(s) = \frac{-3}{(s+2)(s-1)}$$

If the ROC is (a) $R\{s\} > 1$ (b) $R\{s\} < -2$ (c) $-2 < R\{s\} < 1$

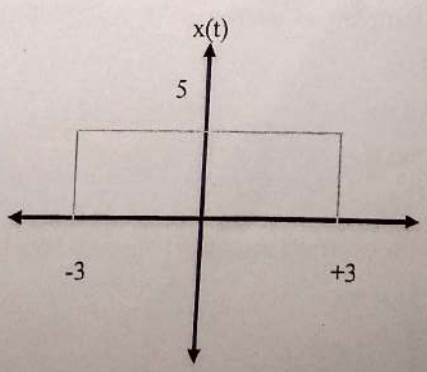
vi. Find the Fourier transform of signal
$x(t) = e^{-at}u(t)$

vii. Define Causal, Anti causal and Non-causal signal.

Section - C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following questions. 2x10=20
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर दें।

i) For the signal x(t) sketch



(a) x(3t) (b) x(t/6) (c) x(3t+2) (d) x(-t) (e) x(-2t-1) (f) x(-1/3t+1)

ii) Solve the second order linear differential equation

$$d^2y(t)/dt^2 + 5dy(t)/dt + 6y(t) = dx(t)/dt + x(t)$$

For Initial Condition $y(0^-)=2$, $y'(0^-)= 1$ and input $x(t) = e^{-4t}u(t)$

iii) Find the convolution output

(a) $u(t) \odot u(t)$ (b) $x(t) = e^{-3t}u(t)$ $h(t) = u(t-2)$

Section – D (खण्ड–द)

Course Name: - B.Tech(EC) **Semester:-III**

Paper Name: - Signals and Systems **Paper Code:- TEC 303**

Time - 30 minutes **Max Marks-20**

Answer all the following questions. **10x2 =20**

1. **What is the Fourier Transform of a signal?**

a) A representation in time domain b) A representation in frequency domain

c) A mathematical operation d) All of the above

2. **The impulse response of an LTI system is defined as:**

a) The output when the input is a unit step function b) The output when the input is a delta function

c) The system's response to any arbitrary input d) The system's frequency response

3. **Which of the following systems is non-linear?**

a) $y(t)=x(t)^2$ b) $y(t)=3x(t)$

c) $y(t)=x(t-1)$ d) $y(t)=x(t)$

4. **What does the term 'system stability' refer to?**

a) Bounded input produces unbounded output b) Bounded input produces bounded output

c) Unbounded input produces unbounded output d) None of the above

5. **The Z-transform is primarily used for:**

a) Continuous-time signals b) Discrete-time signals

c) Both continuous and discrete-time signals d) None of the above

6. **Which statement about energy signals is true?**

a) They have finite energy but infinite power b) They have infinite energy but finite power

c) They have finite energy and finite power d) They have infinite energy and infinite power

7. What is the Nyquist rate?

a) Half of the sampling frequency

b) Twice the maximum frequency of the signal

c) The minimum frequency for sampling

d) None of the above

8. System $x(t) * \delta(t-t_0)$ equal to (*) is show convolution

a) $x(t)$

b) $\delta(t-t_0)$

c) $x(t-t_0)$

d) 1

9. A causal discrete-time signal must satisfy:

a) x[n] depends on future values

b) x[n] depends on past values only

c) x[n] depends on current values only

d) x[n] can depend on both past and future values

10. Which transform converts time-domain functions into complex frequency domains?

a) Fourier Transform

b) Laplace Transform

c.) Z-Transform

d) All transforms

SEMESTER END EXAMINATION, DECEMBER 2024

Course Name: - B.Tech. **Semester:- III**

Paper Name: - Digital system Design **Paper Code:- TEC-302**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70 +20**

समय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70 + 20

Instructions:

- The question paper consists of four sections namely A, B, C,D. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks**.
- Section D- Each question carries **2 mark. All questions are compulsory.**
- Section D- Each question carries **2 mark. All questions are compulsory.**

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Which of the following options represent the correct reduction of

$F = X\overline{Y}\overline{Z} + \overline{X}\overline{Y}Z$

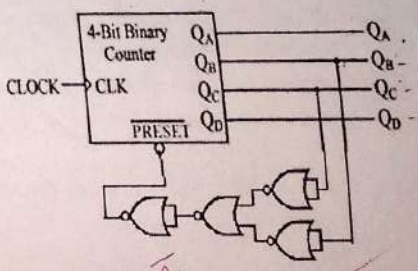
a) $F = \overline{Y}(X + Z) + (X \oplus Z)$

b) $F = \overline{X}Z + \overline{Y}Z$

c) $F = X + \overline{Y}$

d) $F = X\overline{Y}$

ii) A synchronous binary up-counter with synchronous preset input is shown in the figure where Q_A is MSB bit and Q_D is LSB bit. The sequence of counter is



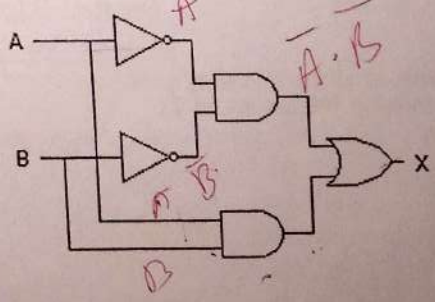
a) 0-1-2-3-4-5-0....

b) 0-1-2-3-4-5-6-0....

c) 0-1-2-3-4-5-F

d) 0-1-2-3-4-5-F-0.....

iii) What type of logic circuit is represented by the figure shown below?



a) XOR

b) XNOR

c) AND

d) NAND

iv) The Three Domains of the Gajski-Kuhn Y-chart are:

a) Physical- Operational- Structural

b) Physical-Behavioural- Functional

c) Physical-Behavioural- Structural

d) Functional-Operational-Technical

v) Race Around condition occur in .....

a) Level Triggered R-S Flip Flop
b) Level Triggered J-K Flip Flop
c) Edge Triggered R-S Flip Flop
d) Edge Triggered J-K Flip Flop

Section – B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर दें।

i. Implement the following Boolean expression using 4:1 multiplexer.

$$F(A,B,C) = \bar{A}\bar{C} + AB + A\bar{B}C + AC$$

ii. What is Race and Race around condition in flip-flop? Design J-K Flip Flop from T flip flop.

iii. Using K – map, obtain the minimal SOP expressions of the following and design output of K-Map by NOR gate

$$F(A,B,C,D) = \sum m(1,3,4,5,6,7,9,11,13,14) + D(0,15)$$

iv. Design and Explain a four bit adder with look ahead carry.

v. What is excitation table? Write excitation table of JK and SR Flip-flop.

vi. Write the basic characteristics of logic families IC.

vii. Explain and write the step of VLSI design flow with diagram?

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर दें।

i) What is difference between combinational and sequential circuit? Implement Full adder and full subtractor logic function using "3:8 decoder".

ii) Compare the synchronous sequential circuit and asynchronous sequential circuit. Also design a synchronous sequential circuit for the following sequence by J-K flip flop:

0-6-4-7-1-5-2-3-0-6-4.....

iii) What is shift register? Write the application of shift register. Design and explain bidirectional shift register.

Section – D (खण्ड–द) (Mid Semester Test)
Objective Questions (वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **10x2 =20**
निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Out of these logic families, which one provides the minimum dissipation of power?

a) TTL
b) JFET
c) CMOS
d) ECL

ii) The Boolean function AB + AC is equivalent to .....

a) $\bar{A}B\bar{C} + AB\bar{C} + \bar{A}BC$
b) AB + BC + AC
c) $ABC + \bar{A}BC + \bar{B}\bar{C}$
d) $ABC + AB\bar{C} + A\bar{B}C$

vii) What is the primary purpose of the Gajski-Kuhn Y-chart in digital system design?

a) To visualize the temporal behaviour of a system.
b) To map out the control flow of a software algorithm.
c) To depict the data flow and control flow of a hardware design.
d) To represent the hierarchical structure of a software system.

viii) For a 4-bit parallel adder, if the carry-in is connected to a logical HIGH, the result is _____

a) The same as if the carry-in is tied LOW since the least significant carry-in is ignored
b) That carry-out will always be HIGH
c) A one will be added to the final result
d) The carry-out is ignored

ix) The boolean function A + BC is a reduced form of _____

a) AB + BC
b) (A + B)(A + C)
c) A'B + AB'C
d) (A + C)B

x) The propagation delay of a gate is defined as:

a) Time taken to reset
b) Time taken for oscillation
c) Time taken to add
d) Time taken to switch states

SEMESTER EXAMINATION, DECEMBER-2024

Course Name: - B.tech **Semester:- 3rd**

Paper Name: - Data Structures and Algorithm **PaperCode:-TCS-303**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय–3 घण्टे+ 20 मिनटप्रति घंटेअतिरिक्त–दृष्टिबाधित एवंसहलेखकपरीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks**.
- SectionC- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks**.

निर्देश:

- प्रश्नपत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। **सभी प्रश्न अनिवार्य हैं।**
- खण्ड–ब में **सात प्रश्नों में से किन्हीं पाँच** प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न **सात अंक** का है।
- खण्ड–स में **तीन प्रश्नों में से किन्हीं दो** प्रश्नों के उत्तर अधिकतम (250-300) शब्दों मेंदें। प्रत्येक प्रश्न **10अंक** का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठप्रश्न)

1. Answer allthe following questions. ***5x3 =15***

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Which of the following is a characteristic of an efficient algorithm?

a) Uses mimimal memory
b) easy to implement
c) Uses minimal CPU time
d) All of the above

ii) What is the value of the postfix expression 6 3 2 4 + - * ?

a) 74
b) -18
c) 22
d) 80

iii) What are the disadvantages of normal binary tree traversals?

a) There are many pointers which are null and thus useless
b) There is no traversal which is efficient
c) Complexity in implementing
d) Improper traversals

iv) Which is the most appropriate infix expression of this expression AB-DE+F*/?

a) (A-B)/((D+E*F))
b) (A-B)/((D*E+F))
c) (A-B)*((D+E/F))
d) None of the above

v) Which Big O notation represents constant time complexity?

a. O(1)
b. O(n)
c. O(logn)
d. O(nlogn)

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum150 words. **5x7=35**

निम्नलिखितमें से किन्हींपाँचप्रश्नों के उत्तर अधिकतम 150 शब्दोंमेंदें।

I. Explain Selection Sort algorithm with the help of example 24,9,29,14,19,27.s

II. Explain binary search tree in detail with the help this example :insert following in order an empty BST

40,60,50,33,55,11.

III. Write the algorithm for binary search also write the difference between linear search and binary search.

IV. Construct a B tree 7,15,3,16,5,1,18,9,35,28,39,17,14,20,22,25,27 having degree (order) 5.

V. Explain Asymptotic notation and its types in detail and find the Big-oh notation for this function: $F(n)=3n^2+2n+1$

VI. Define Graph ,its basic terminologies and also explain its types with the help of example.

VII. Write the algorithm for linked reprentation of stack and convert the prefix expression into postfix expression : +a/*bc-de / bc*de-/a

Section -C

Descriptive Questions (विवरणात्मकप्रश्न)

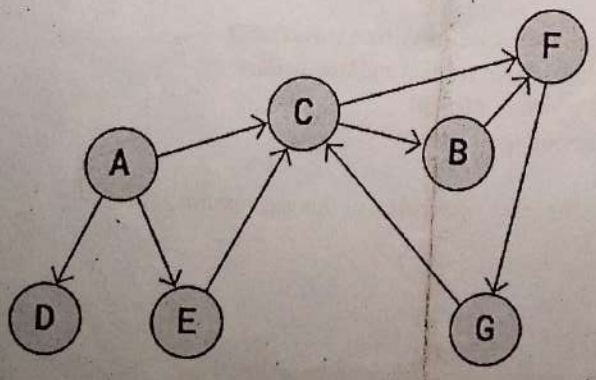
3. Answer any two of the following question in maximum 300 words. **2x10=20**

निम्नलिखितमें से किन्ही दो प्रश्नों के उत्तर अधिकतम 300 शब्दों मे दें।

i) Explain AVL tree in detail and also construct a AVL tree :3,5,11,8,4,1,12,7,2 and 6.

ii) Write the algorithm for Heap sort and perform heap sort on given elements: 5,2,4,7,1,3,2 and 6.

iii) Find out the BFS and DFS traversal for this graph in detail .



Section-D

Course Name: -B.Tech CSE **Semester: - V**

Paper Name: - Data Structures and Algorithm Paper Code: - TCS-303

Time: 30 min

4. Answer all the following questions. **10x2=20**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

(i) What is the disadvantage of a linked list?

a. Dynamic size
b. Ease of insertion/deletion
c. Random access is not allowed
d. None of the above

(ii) Circular Queue is also known as---

a. Square Buffer
b. Ring Buffer
c. Curve Buffer
d. Rectangle Buffer

(iii) Which of the following cannot be implemented efficiently using linked list?

a. Queue
b. Priority Queue
c. Stack
d. Binary Search

(iv) Study the following program:

```
#include <stdio.h>
  int main()
{
int arr[6]={8,9,7,5,2,1};
printf("%d",arr[6]);

    return 0;
  }
```

a.50
b. Garbage value
c. 10
d.None of the these

(v) The time complexity of enqueue operation in Queue is—

a. O(1)
b. O(n)
c. O(logn)
d. O(nlogn)

(vi) A normal queue, if implemented using an array of size MAX_SIZE,gets full when?

a. Rear=MAX_SIZE-1
b. Front=(rear+1)mod MAX_SIZE
c. Front=rear+1
d. Rear=front

(vii) Which sort is not stable sorting?

a. Quick sort
b. Merge sort
c. Bubble Sort
d. Insertion Sort

(viii) The Space complexity in worst case of Merge Sort:

a. O(n)
b. $O(n^2)$
c. O(logn)
d. O(nlogn)

(ix) What is the time complexity to count the number of elements in the linked list?

a. O(n)
b. $O(n^2)$
c. O(logn)
d. O(1)

(x) In a Singly Linked list, what does the last node's next pointer point to ?

a. The first node
b. The second last node
c. Null
d. Itself

SEMESTER EXAMINATION DECEMBER-2024

ourse Name: - B.Tech. (ECE) **Semester:- 3rd**

aper Name: - Electronics Device **Paper Code:- TEC-301**

me - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

मय– 3 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। **अधिकतम अंक–70**

nstructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions in maximum one hundred fifty (150) words. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions in maximum three hundred (300) words. Each question carries **10 marks.**

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में सात प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर अधिकतम (250-300) शब्दों में दें। प्रत्येक प्रश्न 10 अंक का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5x3 =15**
निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Which of the following is correct about NMOS electronic circuits?
   a) For inversion positive voltage is applied to the gate terminal
   b) It has N-substrate
   c) For accumulation positive voltage is applied to the gate terminal
   d) NMOS has holes as the majority of carriers

ii) What is the effect of temperature on the recombination rate of electrons in electronic circuits?
   a) Recombination rate increases with increase in the temperature
   b) Recombination rate decreases with increase in the temperature
   c) Recombination rate is independent of temperature
   d) Recombination of electrons doesn't occur in semiconductors

iii) Which type of semiconductor is used in Tunnel Diode?
   a) Compound semiconductor
   b) Elemental semiconductor
   c) Degenerated semiconductor
   d) Extrinsic semiconductor

iv) Which of the following effects is responsible for violating the mass action law in degenerative type semiconductor electronic devices?
   a) Electronic drift effect
   b) Lattice vibration effect
   c) Thermal effect
   d) Bandgap narrowing effect

v) Which of the following is wrong about P-N junction diodes used in electronic devices?
   a) They have three modes of operations
   b) They have dynamic resistance at low-frequency AC voltage
   c) They have diffusion capacitance at high-frequency AC voltage
   d) They can act as ON-OFF switches

Section – B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions in maximum 150 words. **5x7=35**
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i. Explain the action of P-N junction diode under forward & reverse bias, draw & explain the V-I characteristics of P-N junction
ii. Explain the quantum mechanism & K-E diagram?
iii. Discuss about the common-base, common-collector configurations of BJT with their input and output characteristics.
iv. Explain the operation of n-channel JFET with neat diagram. Also sketch its drain and transfer characteristics. Define pinch-off voltage.
v. Explain the Emers-Moll model & C-MOS transistor.
vi. A diode operating at 300K has forward voltage 0.4 V across it when the current through it is 10 mA and 0.42V when the current is twice as large. What value of I0 and η allow the diode to be modelled by the diode equation?
vii. Explain the P-type Semiconductor & N-type Semiconductor.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 300 words. **2x10=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 300 शब्दों में दें।

i) Explain the operation of n-channel enhancement MOSFET with neat diagram. Also draw its drain and transfer characteristics.
ii) For an N- channel JFET has a pinch off voltage of -4.5V and I_{DSS}=9ma. At what value of V_{GS} will I_{DS} be equal to 3mA? what is its gm at this I_{DS}?
iii) Explain the working of the following:
(a) LED
(b) Solar cell
(c) Zener diode

Mid Semester -Sessional Examination 2024

Course Name: - B.Tech. (ECE) **Semester:- 3rd**
Paper Name: - Electronics Device **Paper Code:- TEC-301**

Section – D
Objective Questions

1. Answer all the following questions **10×2 = 20**

(i) Which of the following is not a property of semiconductors used in electronic devices?
a. They don't emit light
b. hey excite electrons
c. They have high thermal conductivity
d. They have variable electrical conductivity

(ii) What is the effect of temperature on the recombination rate of electrons in electronic circuits?
a. Recombination rate increases with increase in the temperature
b. Recombination rate decreases with increase in the temperature

c. Recombination rate is independent of temperature
d. Recombination of electrons doesn't occur in semiconductors

(iii) Which of the following is correct about semiconductors in electronic devices?

a. Elemental semiconductors have direct band gap
b. Compound semiconductors have indirect band gap
c. Extrinsic semiconductors are injected with impurities
d. Doping is done in Intrinsic semiconductors

(iv) Which of the following is correct about Hall Effect in electronic circuits?
a. Hall voltage is directly proportional to the charge density
b. Hall voltage is inversely proportional to the intensity of the magnetic field
c. Intrinsic semiconductor has a positive temperature coefficient of hall constant
d. Hall voltage is very weak in metals as compared to semiconductors

(v) Which of the following is correct about NMOS electronic circuits?
a. For inversion positive voltage is applied to the gate terminal
b. It has N-substrate
c. For accumulation positive voltage is applied to the gate terminal
d. NMOS has holes as the majority of carriers

(vi) On the drain characteristic curve of a JFET for $V_{GS} = 0$, the pinch-off voltage is
a. below the ohmic area.
b. between the ohmic area and the constant current area.
c. between the constant current area and the breakdown region.
d. above the breakdown region

(vii) The output characteristics of a MOSFET, is a plot of

a. Id as a function of Vgs with Vds as a parameter
b. Ig as a function of Vgs with Vds as a parameter
c. Id as a function of Vds with Vgs as a parameter
d. Ig as a function of Vds with Vgs as a parameter

(viii) When the voltage across the zener diode increases_____
a. temperature remains constant and crystal ions vibrate with large amplitudes
b. temperature remains constant and crystal ions vibrate with smaller amplitudes
c. temperature decreases and crystal ions vibrate with large amplitudes
d. temperature increases and crystal ions vibrate with large amplitudes

(ix) Avalanche breakdown in zener diode is _____
a. electric current multiplication takes place
b. phenomenon of voltage multiplication takes place
c. electrons are decelerated for a period of time
d. sudden rise in voltage takes place.

(x) Which of the below is widely used, in the application of Zener diodes?
a. Series regulator
b. Shunt regulator
c. Rectifiers
d. Clamper

.....